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THE EFFECT OF WILD FIRES ON THE FOREST ENVIRONMENT OF ALASKA

Since the birth of the 49th State the spotlight of National and international interest has turned toward Alaska and its many problems. It is a pleasure to appear here today as an Alaskan and to present to you some of our findings regarding a few of these problems and how we believe they may be corrected.

Some of the material used in this paper has been taken from a bulletin "Ecological Effects of Forest Fires in the Interior of Alaska," prepared by Professor H. J. Lutz of the Yale Forestry School, who has spent many summers in Alaska on forest research work sponsored jointly by the Bureau of Land Management and the Forest Service, particularly as to ecological effects of forest fires on vegetation of Alaska.

Probably the three major factors contributing to many of our problems in Alaska are its size, remoteness, and lack of ground transportation.

Alaska land area totals approximately 365.5 million acres, or one-fifth that of the other 49 States combined, but with a road system of only 5,000 miles. It is significant that 99 percent of the land area of Alaska is federally owned. Even after State selection of approximately 104 million acres, the Federal Government will still have under its jurisdiction about 260 million acres, of 71 percent. Fire and resource protection will still be a big job in the years ahead. The total area of lands under the jurisdiction of the BLM requiring protection from fire is 225 million acres.

The question has often been asked: "What is there to protect?" Eliminating 20.7 million acres of valuable National Forest lands which lie primarily in the fog belt along the coast, we find a vast area commonly referred to as the Alaska Interior. It embraces the region lying between the Brooks Range on the north and the Coastal Range on the south. Of this area, about 125 million acres bear sufficient tree growth to justify designation as forest land. This great, predominantly coniferous forest has its counterpart in northern Canada, the Scandinavian countries, and northern Russia. It represents a tremendous potential source of wood and cellulose. The remaining 100 million acres is comprised, for the most part, of rolling hills of grassland and the flat, excessively wet, lowlands variously referred to as "muskeg," "tundra," or "bog."

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Most of this region lies north of the Alaska Range and includes the great valleys of the Kuskokwim, Tanana and Yukon Rivers and their tributaries. There are also the Kobuk and Noatak drainages to the north which empty into the Arctic Ocean. The majority of these rivers meander through numerous lowland channels and are heavily laden with silt from glaciers and bank cuttings. In general, the country is rolling upland with broad lowlands, with scattered mountain masses and peaks.

The interior has a semiarid climate, with great extremes in temperature. Two divisions are recognized. One south of the Alaska Range averages from 15-20 inches, and temperature extremes are from minus 36 to a high of 92. The area north of the Range having a concentration of lightning and preponderance of timber stands has annual precipitation ranging from 10 inches to 15 inches. Temperatures range from the minus 70's to plus 100 degrees.

For all practical purposes, there are only two seasons--winter and summer. In the summer, which begins in early May shortly after the ice breakup, the great land mass warms up very rapidly and temperatures run about 80 degrees, with extremes of 100. Due to the long daylight hours during summer--ranging from 18 to 24 hours, the length of the growing season is much greater than a comparable number of days elsewhere in the United States. To illustrate, the City of Fairbanks on the Fourth of July holds a traditional baseball game starting at midnight. Wild flowers grow in profusion, and garden vegetables reach unbelievable sizes. Heads of cabbage, for instance, have reached weights of 60 pounds, measuring 36 inches across. You can well understand that such a land of continual sunshine and high temperatures means nothing but trouble for the weary firefighter.

The forests as seen from the air, appear as a complex mosaic of vegetative types. In general, the forest occupies the valleys, often appearing as belts which follow meanders of the streams and the lower sloughs and benchlands. Timberline occurs between 2,000 and 3,000 feet. The complexity of the vegetative patterns is mainly the result of past fires. Sharp boundaries between types can be recognized as the edge of old burns. Areas now treeless, on close examination, prove to have formerly supported full forest stands which were destroyed by repeated burning.

The view sometimes expressed that the interior supports only small and scrubby timber, and that growth is excessively slow, is erroneous. In mature stands of 120 years which have escaped fires, white spruce will average 18-24 inches, with occasional trees as large as 36 inches. Heights will run around 80 to 100 feet. There are estimated to be 350 million board-feet of timber, or 700 million cords of pulp material within the interior of Alaska. Probably the volume burned each year in the past could support about 10 pulp mills, such as the one at Ketchikan, Alaska, which processes 500 tons of pulp per day.

These forests are peculiarly liable to destruction due to low precipitation and long daylight hours coupled with high temperatures. The forest types of white spruce, paper birch, aspen, poplar, and black spruce are by their very nature readily inflammable. This, combined with a heavy growth of "beard lichens," moss, and low hanging branches, makes for fast spread of fire. The peat bogs found in the lowlands also burn readily and hold fire, in some instances through the long cold winters.

The major cause of fire from earliest times to the present has been man, the Indian, the miner, originally, and now the hunter and tourist are added risks. However, the larger and more extensive fires were and still are caused by lightning although they represent only 28 percent of the total by number. During the famous gold stampede following the 1896 Yukon gold discovery, millions of acres burned each year. Railroad and highway construction was also a contributing factor to the widespread burning.

The interior forests vast potential pulpwood reserve awaits only a favorable economic climate for industrial development. The Timber Resources Review of the Forest Service conservatively estimates that the annual National pulpwood consumption will run 56 million cords per year by 1975 and about 90 million cords by 2000. Most of Southeast Alaska pulpwood forests are already committed under long term sales to pulp plants now operating, under construction, or in the planning state. It appears Interior of Alaska is the last great United States reservoir for pulpwood material.

Forest vegetation development following fires in the interior tends to change on well drained sites. White spruce forests change into paper birch and quaking aspen, while stands of paper birch and aspen appear to perpetuate themselves, as does black spruce, which is usually found where the drainage is poor and the permafrost table is close to the surface. Continued large burns on many areas have so completely destroyed the seed source that many stands may eventually have to be artificially seeded before tree growth can once again become established.

The forest soils of the interior are shallow with a permafrost table usually close to the surface. The permafrost is covered with a mantle of peat, lichens, and mosses, which tend to insulate the soil. The degree to which forest floor material is consumed varies with the intensity of the burn. However, due to the insulation, mineral soils are affected only in the most severe burns. Practically none of the organic matter within the mineral soil is consumed. Chemical changes in forest soils resulting from fires appear to be ecologically favorable, especially in light burns. Although the total nitrogen capital of the site is reduced by fires which consume the forest floor material, the nitrogen available to plants appears to be increased. Acidity is decreased and exchangeable calcium, potassium and readily available phosphorus are increased.

The effect of forest fires as to water supply is much the same as that found on other forested areas. It tends to increase runoff, especially on steep slopes.

Due to the permafrost character of the lowlands, moisture is not absorbed and runoff is normally rapid. All low valley areas which do not have a definite stream pattern catch and hold the water, which results in many lakes. The problem of water supplies in the Alaska interior will become more acute as population increases and development takes place. With increased demands, more attention will have to be given to the hydrologic rate of the forests.

Forests are not the only renewable resource of interior Alaska. Wildlife plays a very important role. One often hears the expression, "the land is lying idle and is contributing nothing. We must get industry started to realize some value from the land." Each year we are cropping an estimated 3,500 moose and 16,000 caribou with a cash value of at least $3,200,000. This figure is increasing each year. The increase can be sustained only as long as proper habitat and food base are provided.

These animals, beside the food potential, provide clothing, skin tents, footwear, and numerous other articles. A typical so-called "unproductive" valley may produce an annual crop of 500 moose, $100,000 worth of beaver and muskrat pelts, plus many species of other game animals and fish. These lands are already the basis for expenditures of some 20 million dollars annually by outdoorsmen, hunters, fishermen, and photographers. Between 500 and 1,000 nonresident hunters come to Alaska each year for big game, and thousands for small game. Almost every eligible resident fishes or hunts, and we must recognize the tremendous contribution to not only the immediate economy, but also to our physical and spiritual well-being.

In certain areas following fire there has been evidence of increase in the moose population. It is natural to assume that browse which follows some fires makes a more attractive habitat. However, records indicate that moose have been moving westward and northward for 75 years, and this movement has taken animals into areas where burning has not occurred.

The effect of fires on caribou is generally agreed to be harmful or even disastrous. This animal normally ranges in herds of 1,000 to as many as 30,000 head and lives in environments characterized by climax communities, tundra, and forest tundra. Its normal forage is reindeer lichens, beard lichens, and other tundra mosses and plants. All of these lichens are highly inflammable when dry, and readily susceptible to destruction by fire. It takes this type of range 40 to 50 years to recover from severe fire and half a century is a very long time for caribou range to be out of production.

Repeated burnings may be good for certain types of game. However, it is certainly true that accidental, uncontrolled wild fires can no more be justified in wildlife management than in forest management.

Northwestern Alaska's river bottoms and deltas comprising principally the Lower Kuskokwim and Yukon Valleys is one of the greatest waterfowl nesting areas in the world. This area contributes to all North American Flyways: Pacific, Central, Mississippi, and Atlantic. It is one of the principal nesting grounds of the Black Brant and the sole nesting ground of the Cackling Goose. It also provides nesting grounds for many of our favorite species of ducks. The Copper River drainage has recently been found to be a nesting place for the rare Trumpeter Swan.

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The majority of the areas where large scale nesting is found is fairly free from wildlife due to the abundance of water and also to the fact that much of the nesting is done on small islands. The big delta areas of the Yukon and Kuskokwim are good examples. There is definite evidence however, that large fires that sweep across the valley floors take a toll of waterfowl mostly in the form of ducklings and eggs.

Fire control in Alaska was first recognized in 1939 when the Alaska Fire Control Service was set up under the General Land Office. This organization was absorbed in 1946 by the Bureau of Land Management. From the beginning to the present it has been an uphill battle. The first appropriation was $37,500, but at that time the Civilian Conservation Corps furnished the manpower and facilities.

Today, we find an up-to-date fire organization in every respect, with smokejumpers, borate spreading planes, a fire danger rating system, a complex radio communications system, and a small fleet of aircraft. At first one might think the BLM is ready to do a complete job.

It is difficult to imagine the logistics that go into the planning of fire suppression for an area of 225 million acres with practically no roads and only scattered landing fields. Smokejumpers were dropped during this last season as much as 350 miles from their base of operations. In many cases they were dropped into areas where only helicopters could follow with firefighters and supplies. For a dozen or so fires a week, with limited aircraft this system works, but when lightning crackles from the mouth of the Yukon River to the Canadian Yukon border, a distance of over 1,000 miles, a major task must be met. During this year's fire season about 1,558,729 acres were burned in Alaska.

The Bureau at present has two large fire control stations with full facilities located at Anchorage and Fairbanks. These are augmented by 12 one-man fire guard stations. Much of the early success this past season can be attributed to smokejumpers and the use of borate. However, when the distances from operating bases to the fire reached over 200 miles and the number of fires increased materially due to lightning storms, then the system tended to break down. More stations such as the ones at Fairbanks and Anchorage must be built and manned at strategic points throughout the Interior. Early detection and fast transportation are the key to better suppression, and this can only be accomplished if and when these terrific distances can be lessened, thereby cutting supply line problems and costs.

All improved techniques are being used. A fire education program is in full bloom. Campgrounds and picnic areas have been built. All of the things it takes to promote forest-fire consciousness is being done. This is good, but it does not put out fires once they are started. It is estimated that the area can be protected for ½ to 1 cent per acre per year, which is peanuts compared to fire cost contracts now in force in the Pacific Coast States.

The destiny of Alaska can be achieved only if her resources are widely used. Widespread destruction of forest and other vegetation by fire, with all its train of harmful effects, cannot be judged wise use. The citizens of Alaska and the country in general have a serious responsibility if the State of Alaska is truly to become "The Great Land."

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